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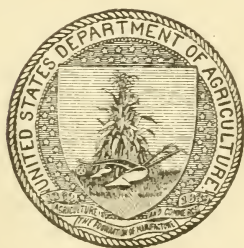
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# EFFECT OF FOREST FIRES ON STANDING HARDWOOD TIMBER.

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## EFFECT OF FOREST FIRES ON STANDING HARDWOOD TIMBER.

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The aim of this leaflet is to point out some of the direct and immediate injurious effects of light fires in a forest. Even a light fire may and does injure in many ways both public and private timber, and causes an actual money loss which can be measured in dollars and cents. When the actual damage done by fires is realized, their prevention will be as much the duty of the citizen as it is now his duty to protect his home from burning.

The most noticeable effects of a fire are the killing of the young growth, the destruction of the layer of leaves and mulch on the ground which protects the soil from washing in times of heavy rains, and the fire scars left on the trees of all ages and sizes. It is the object of this leaflet to call attention especially to the damage to merchantable timber evidenced by these fire scars. Though the study upon which the circular is based was made in the Ozark Mountains of Arkansas, the results are applicable to other hardwood regions.

All settlers and lumbermen who have worked in the hardwood timber in the Ozarks know only too well what is meant by pin worms, bunch worms, flag worms, grub worms, soak, and butt rots, and how great is the loss of timber due to them. Damage by insects and rot was found in connection with practically every fire scar on the bases of the trees. The fire may have occurred 50 or 100 years ago, and all signs of it been hidden by later growth, but during the two or more years that it took the tree to heal over the scar, worms, and spores or germs which produce rot in trees, entered at this open wound on the butt, and, in the case of the rots, have been at work ever since, gradually destroying the timber in the trunk.

Any little pile of leaves and other trash, which winds and water may have left lodged against the base of a tree, will, when dry and set on fire, produce sufficient heat to cook and kill the living bark and sapwood for several square inches on the butt. The injury thus caused is apparently slight, but in reality the damage done may continue during the entire life of the tree, and may finally cause its death. It is mainly through such small fire scars that the worms and rots get into trees.

The spores, or "seeds," of the tiny fungus plants which cause the rot fall on the dead spot or fire scar, sprout during damp weather and grow into the heartwood of the tree. Once in the heartwood, the little plants use part or all of the wood as food, and thus gradually destroy the sound timber, producing what is called rot, dote, or soak in the trunk of the tree. The small fire scar may, and usually does, heal over, so that in a few years no evidence of a fire or injury to the tree can be seen from the outside; but the rot continues to grow for years, slowly spreading outward, until it reaches the sapwood, and upward in the trunk, thus ruining the tree for most commercial purposes. Every time a tree is reached by a fire hot enough to kill a small area of the bark and sapwood an opportunity is given for more worms to enter and for another attack by the little plants which produce rot. Where trees are growing on steep slopes small piles of trash collect on the upper sides at the base. In such cases even a light fire, which ordinarily would not be able to injure the tree at all, burns this pile of trash and a fire scar is formed. On the sides of Pilot Mountain are dense stands of young oak saplings from 2 to 6 inches in diameter, every one of which has a fire scar on the upper side of its base, due to the burning of these piles of trash. This means that a large number of these saplings will grow into trees having butt rots and wormholes in the trunks. Similar conditions can be seen on nearly every mountainside in the Ozarks.

Anyone in passing through a stave sale area after all the good bolts have been removed has noticed the large amount of cull left on the ground. Sometimes entire trees have not yielded a single bolt. What was the matter? Worms, rot, or soak had ruined the tree for staves. Cull butts from 6 to 16 feet in length are not uncommon on many areas where the timber has been felled. In nearly every case these butts were left on account of rot. Practically all of this was caused by fires which injured the bases of the trees.

The loss of good merchantable timber in a stave operation from rot and worms alone is enormous. Yet it is often said that light fires do not injure the forest, and some even claim that it is a benefit to burn the forests annually. On one stave sale area in the Ozarks 76 trees out of every 100 felled had butt rot, and 27 trees in every 100 had wormholes of some kind in them. What does this mean? It means that after going to the expense of felling 100 trees only 24 of them were perfectly sound and suitable for staves. Not only was there a money loss from the cull of 76 trees, but the expense of felling unsound trees must be considered. For five widely separated areas in the eastern part of this forest an average of 65 trees in every 100 had butt rot, and 26 had wormholes sufficient to cull some of the bolts.

Most of this loss can be traced directly to the fires so common in this forest. The area where 76 trees in every 100 were found to have butt rot has been burned over regularly for years. Over areas where fires had not been so frequent, the injury from butt rots was correspondingly less. The loss of timber in stave operations from worms and rots alone will often average one-fourth of the total amount of material actually used for staves. It is for this very reason that stave men in buying private timber offer such low prices: they do not know till the timber is felled and worked up just how much loss there will be from worms, soak, and rot; they do know, however, that the loss will be great. The loss from worms and rot caused by forest fires is not confined to white oak, but extends to red and black oaks as well. Old fire scars on the butts of these trees are the usual places where many wood-boring insects enter the tree. On some areas as many as 33 trees out of every 100 red and black oaks felled had been injured by grubworms. The usual butt rots of white oak are also found in the other oaks, and fire scars are the places through which they enter.

Another way that fires injure standing timber is by burning through sound bark and sapwood into the hollow butts. Once the hollowed-out interior of the tree is exposed to the air, the rot which originally caused the hollow seems to grow up the tree more rapidly, while other fires that follow gradually widen the hollow and destroy the bark at the base of the tree until the tree is killed.

A tree which has an open, hollow butt is much more easily blown down than one in which the hollow is inclosed by living bark and sapwood.

We find, then, that forest fires damage standing timber in three ways: By producing fire scars through which worms enter, by opening a passage through the bark and sapwood for rots to reach the heartwood, and by weakening trees with hollow butts till they either burn down, die from fire girdling, or are blown over by strong winds. Every fire, therefore, only increases the damage by making possible a new crop of worms in the trees and by giving another chance for rots to enter through the new fire scars, thus increasing the quantity of unmerchantable material and decreasing the amount of money received for the timber.

This deterioration in the standing timber is the direct source of a tremendous loss to the entire community, for no one will buy worthless timber. The timber itself is not only a total loss to the settlers and other owners, but by its presence it also increases the cost of lumbering and decreases the stumpage value of what timber is merchantable. Furthermore it means a loss in wages to the laborer, and a loss to the State of the 35 per cent of all receipts from the sale of

Government timber appropriated by Congress for the construction of public roads and for the maintenance of schools within the State.

The conclusion, then, is obvious, that the continued burning of timbered lands in Arkansas is causing an annual loss of thousands of dollars—an absolute detriment to the welfare of the State. And it is equally obvious that this loss can be almost entirely eliminated by the prevention of all forest fires, whether large or small—a comparatively easy matter if all the people will only cooperate in the work.

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